method for determining the position and/or orientation according to claim 13 and a corresponding computer program or computer program product according to claims 23 and 24, respectively. Advantages of the invention are disclosed in the respective subclaims and also in the following description.

In the tracking system according to the invention, at least one computing device for evaluating the images captured by the image recording devices and also means for retransferring information calculated by such a computing device to another computing device and/or to the image recording device are provided. Hereby, a bidirectional data transfer is possible, which in comparison to the present unidirectional data transfer offers appreciable advantages. The retransferred information is used for controlling the image recording and/or the image evaluation. Hereby, for example, information about location, size and luminosity of the relevant markers can be used for optimizing the image recording and also for handling the image areas, which are relevant and not relevant for the readout process, differently. Further, information about position or orientation of the object can be used for extrapolating the expected positions or orientations, and the image recording and evaluation can be organized accordingly.

The disadvantages of separating the individual computing steps in the direction from image recording to output of tracking result are overcome with the invention, by retransferring information, in particular, from the location where the first tracking results are available to the locations where the image recording and the first steps of image processing are executed (which are, in general, the image recording devices and the computing stages which determine the marker positions in the image).

Often, the computing stages for the image evaluation are separated not only logically, but also physically into a 2D-computing stage and a central 3D-/6D-computing stage connected to its output. In the 2D-computing stage, the marker positions are calculated in the image coordinates of the image recording device, so that often a computing stage of this type is directly allocated to each image recording device. From the data determined, the three dimensional position data or six dimensional position and orientation data is then calculated in a central computing device. In an arrangement of this type it is advantageous to retransfer information from the central computing device to the computing device allocated to an image recording device and if required, also to the image recording device itself. Hereby, the parameters for image recording can be controlled in the image recording device itself and set optimally and also the subsequent image processing in the 2D-computing stage can be optimized in dependence on the calculated position and/or orientation of the object.

In general, the retransferred information refers to the current tracking data that was determined for the direct past, and from which the current point of time can be inferred. Further, it can refer to current data loaded into the system from outside which is relevant for the tracking. Finally, it can refer to a priori information regarding the initial situation. When current tracking data is retransferred, then a closed control loop is formed, which in numerous situations offers potential for improvement compared to the present functioning with unidirectional information flow.

With the retransfer of information, valuable computing time can be saved and the accuracy can be enhanced in the

readout process of the image recording device and also in the identification of markers and calculation of their two-dimensional positions.

It is also possible, for this purpose, to combine the 2D-computing stages, i.e. the computing devices allocated to the individual image recording devices, for delivering information or for forwarding information from the central computing device.

It is advantageous to incorporate a prediction device into the information retransfer, through which data of the directly preceding image recordings can be extrapolated to the data expected in the present image recording. Hereby, for example, expected marker positions can be calculated in the two-dimensional image and the following image processing can be limited to the area in which markers are expected. In the areas in which no markers are expected, the readout of the image recording device and the marker identification and position determination can be either entirely omitted or carried out with less accuracy or only in certain time intervals. This enhances the processing speed and saves memory space.

The information to be retransferred can also be the current or expected marker sizes. Nonspecific reflexes can then, only on the basis of an information regarding the size, be blanked out. The computing time for the time-consuming position determination of such reflexes is dispensed with, and can be used for an improvement in the calculation of the relevant markers.

Information about the current or expected appearance of artifacts (often owing to markers obscuring one another partially) can also be retransferred. Thereby, the calcula-